

# **Two-in/Two-out Standard Operating Procedure for the Hialeah Fire Department**

## EXECUTIVE DEVELOPMENT

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## **ABSTRACT**

This research project analyzed the two-in/two-out provisions of U.S. OSHA's 1998 Respiratory Protection; Final Rule 29 CFR 1910.134. The problem was that the Hialeah Fire Department currently did not comply with these provisions. The purpose of this research was to develop a standard operating procedure that requires compliance with the two-in/ two-out provisions.

This project incorporated action, historical, and descriptive research to (a) determine whether the Hialeah Fire Department in Hialeah, Florida is required to comply, (b) determine the requirements of the two-in/ two-out provisions of the Respiratory protection; Final Rule of 1998, (c) determine the minimum number of fire fighters needed to initiate an interior structural fire fighting operation in compliance with the 1998 Final Rule, and (d) determine the necessary changes for the Hialeah Fire Department to comply.

The procedures used for this research project included a review of published articles, OSHA regulations, Florida Statutes and Codes, official correspondence, and departmental policy. The information obtained was used in developing the rapid intervention team standard operating procedure, checklist and equipment list for the Hialeah Fire Department.

The results of this research revealed compliance with the two-in/two-out provisions although not legally required will improve fire fighter safety and assist in reducing civil liability. Compliance can be achieved by adherence to the rapid intervention team standard operating procedure.

This research recommended that the Hialeah Fire Department improves fire fighter safety and follows prudent risk management principles by complying with the two-in/ two-out

provisions. By adopting and implementing the RIT standard operating procedure, fire ground safety will improve and liability will be reduced.

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## INTRODUCTION

Interior structural fire fighting presents inherent dangers to the safety of fire fighters. The Hialeah Fire Department recognizes these dangers and seeks ways to minimize them. One way to increase the safety of fire fighters is a rapid intervention team (RIT) for rescue and support on the fire ground.

This research project analyzed the two-in/two-out provisions of the U.S. Occupational Safety and Health Administration (OSHA) Respiratory Protection; Final Rule of 1998 in regard to the Hialeah Fire Department in Florida. The State of Florida is not an OSHA plan state, so the Hialeah Fire Department is not mandated to comply with Final Rule unless adopted by the Florida State legislature. Florida is required to comply with the 1993 U.S. OSHA Respiratory Protection standards.

The U.S. OSHA Respiratory Protection: Final Rule standard requires at least two fire fighters enter the immediately dangerous to life and health (IDLH) atmosphere (two-in) and stay in visual or voice contact. Two additional fire fighters must be present outside the IDLH atmosphere for fires beyond the incipient phase (two-out). These two outside fire fighters must be properly trained, equipped and ready to rescue the fire fighters in the IDLH atmosphere, if needed. Rescue of trapped or endangered occupants is an exception to the two-in/two-out provisions.

The Hialeah Fire Department can improve fire fighter safety during interior structural fire fighting by instituting a rapid intervention team (RIT) standard operating procedure and checklist. A RIT improves fire fighter safety by having a team of fire fighters ready to assist or rescue the fire fighters in the IDLH atmosphere.

The problem is the Hialeah Fire Department does not have a standard operating procedure (SOP) requiring a minimum number of fire fighters on the fireground before initiating an interior structural fire fighting operation. It is permissible to enter an IDLH atmosphere with only three fire fighters on the scene for fires beyond the incipient stage, one of, which is the driver/engineer who is performing pump operations.

The purpose of this research project is to develop and implement a SOP in compliance with the two-in/two-out provisions of U.S. OSHA's Respiratory Protection; Final Rule of 1998. In addition, to develop, implement, and distribute a checklist for the rapid intervention team to utilize to improve fire ground safety.

Action research supported by historical and descriptive research assisted in answering the following questions:

Question 1. Is the Hialeah Fire Department required to comply with the two-in/two-out provisions of OSHA's 1998 Respiratory Protection; Final Rule?

Question 2. What are the requirements of the two-in/two-out provisions of OSHA's 1998 Respiratory Protection; Final Rule?

Question 3. What is the minimum number of fire fighters required on the fire ground prior to initiating an interior structural fire fighting operation in accordance with the two-in/two-out provisions?

Question 4. What changes are required by the Hialeah Fire Department to comply with the two-in/two-out provisions?

### **BACKGROUND AND SIGNIFICANCE**

The Hialeah Fire Department is located in the south Florida area. The State of Florida is not one of the 25 U.S. OSHA plan states therefore U.S. OSHA regulations are not mandatory

unless adopted by the state legislature or local government. (Respiratory Protection, 1998). As such the Hialeah Fire Department does not have to legally comply with the two-in/two-out provisions of the Respiratory Protection; Final Rule of U.S. OSHA. The Florida Division of Safety adopted portions of the July 1993 revisions to the U.S. OSHA standard for respiratory protection, which did not specifically address requirements for interior structural fire fighting operations. Ethically the fire department should comply since the 1998 Respiratory Protection; Final Rule increases fire fighter safety, which is important with all the personnel of the organization and it is the right thing to do. Compliance with the two-in/two-out provisions would also assist the fire department in applying risk management principles in accordance with the United States Fire Administration recommendations.

U.S. OSHA has become more involved in the safety regulations for the fire service in the past few years. OSHA issued a formal interpretation in May of 1995 regarding regulations on self-contained breathing apparatus, safety on the fire ground, and emergency operation staffing. This interpretation required four fire fighters on the fire ground prior to entry into a known IDLH atmosphere for interior structural fire fighting operations. In January 1998 OSHA issued the Respiratory Protection; Final Rule 29C.F.R. Parts 1910 and 1926. The Final Rule clarifies the two-in/two-out standard and reduces the misinterpretations of the previous standard. (Respiratory Protection, 1998).

The Final Rule requires that workers engaged in interior structural fire fighting work in teams of at least two, (two-in). An additional requirement is that there are at least two properly trained and equipped standby personnel outside the IDLH atmosphere ready to effect a rescue of the two-in, if needed, (two-out). An exception to the two-in/two-out provisions is provided for the rescue of endangered person or persons. One of these standby personnel can have other fire

ground duties as long as abandoning these duties does not compromise the safety of the fire fighters engaged in the interior fire fighting. (Respiratory Protection, 1998). These provisions are consistent with the 1997 National Fire Protection Association (NFPA) 1500, 6-4 standards. (National Fire Protection Association, 1997).

The minimum number of fire fighters that the two-in/two-out require prior to initiating an interior structural fire fighting operation for fires beyond the incipient stage according to the 1998 Final Rule is four. Two fire fighters in voice or visual contact are required for the interior operation and two additional fire fighters are required as standby personnel outside the IDLH atmosphere ready to assist the interior personnel, if needed. All of these personnel must be properly trained and equipped to assist the interior fire fighters. An exception to the two-in/two-out provisions is permitted if entry into the IDLH atmosphere would save a life or prevent serious injury to the victim or victims. (Respiratory Protection, 1998).

The Hialeah Fire Department operates seven fire stations that protect approximately 22 square miles with a population in excess of 215,000 people. The normal personnel assignment is three for each of the seven engine companies, two aerial companies, and six Advanced Life Support rescue units. The Hazardous Material unit has a minimum staffing of two. One battalion chief and two district chiefs are assigned to each of the three 24 hour shifts. In 1997 26,499 alarms were received. 86 percent were emergency medical alarms, 11 percent were structural fire alarms and four percent various other emergency alarms. (Deputy Chief Roger Letourneau, personal interview, January 9, 1999).

A rapid intervention team standard operating procedure would increase fire fighter safety on the fire ground by having personnel ready to assist or rescue fire fighters in an emergency prior to commencing an interior structural fire fighting operation. In 1996 the fire department



required an additional rescue unit dispatch to have a rescue crew ready to assist any of our fire fighters if they became victims. (Hialeah Fire Department Administrative Memorandum # 96-53, June 25, 1996). Interior fire fighting operations are permitted prior to arrival of this additional rescue. A RIT would increase the safety of fire fighters on the scene. The 1998 Final Rule of the OSHA's Respiratory Protection Act requires two properly trained and equipped fire fighters outside the IDLH atmosphere before interior fire fighting can begin for fires beyond the incipient phase. (Respiratory Protection, 1998). This provides for a safer fire ground operation.

The research problem presented directly relates to the organizational culture, ethics and legal components of the Executive Development course of the National Fire Academy. The Executive Development course provided the knowledge and skill to develop and implement a RIT standard operating procedure. A RIT provides for a safer fire ground operation, which is important to all the personnel in the organization and will reduce the liability to the Hialeah Fire Department.

## **LITERATURE REVIEW**

The Literature Review began with a review of applicable laws, regulations, standards, fire professional journal articles, and official correspondences that addressed the two-in/ two-out provisions of OSHA's 1998 Respiratory Protection; Final Rule, Code of Federal Regulations 29 Parts 1910 and 1926. Hialeah Fire Department Administrative memorandums, area fire department proposed standard operating procedures, and an informal interview with Hialeah Fire Department Deputy Chief of Operations Roger Letourneau were also reviewed.

The Literature Review focused on two main areas in reference to the two-in/ two-out provisions, compliance and the requirements of two-in/two-out provisions. Four issues reviewed in the compliance area were legal, safety, ethics and risk management. The issues reviewed in

the requirement area were the incipient stage, IDLH, two-in, two-out, properly trained and equipped, and the exception to the provisions.

In 1970 U.S. OSHA promulgated and adopted respiratory standards developed by various organizations such as the NFPA. (Respiratory Protection, 1998). OSHA has progressively expanded the standards and the work places that are covered. (Respiratory Protection, 1998). Fire fighting is one area where the coverage is now specifically included “in response to the record evidence about the extreme hazards of the activity” (Respiratory Protection, 1998, p. 1245).

On January 8, 1998 U.S. Secretary of Labor Alexis Herman and Assistant Secretary of Labor Charles Jeffress signed and released the Final Rule of OSHA Respiratory Protection regulations. This final standard, which replaces the respiratory protection standards adopted by OSHA in 1971 was published in the Federal Register and became effective April 8, 1998 with compliance for the 25 OSHA plan states within six months. (Respiratory Protection, 1998). The non-OSHA plan states or local jurisdictions can voluntarily adopt these standards if they so desire. Campell (1998) reported, “Previously, two-in, two-out was not a regulation, but part of an interpretation of safety regulations issued in 1995 by Assistant Secretary of Labor James Stanley, and as such did not have the force of law” (p. 12). The Final Rule justifies the revision by:

OSHA’s experience in enforcing the previous standard also indicated that some of that standard’s requirements were not understood clearly by the regulated community, and so were not adequately effective in protecting workers. The clarification in this new standard will contribute to enhanced compliance by reducing misinterpretation and inconsistencies. (Respiratory Protection, 1998, p. 1158).

The Two in/ two out proposal was originally a tentative amendment to NFPA 1500, which was incorporated in the 1997 edition of the standard. The 1997 edition of NFPA 1500 provides:

In the initial stages of an incident where only one team is operating in the hazardous area at a working structural fire, a minimum of four individuals is required, consisting of two individuals working as a team in the hazard area and two individuals present outside this hazard area for assistance or rescue at emergency operations where entry into the danger area is required. (National Fire Protection Association 1500, 1997, 6-4.4).

OSHA's new Respiratory Protection revisions are consistent with the previous standard in regard to who is legally required to adhere to their standards. Edwards states, "A major concern is the assessment phase in whether the OSHA standard applies to your department. The OSHA standards apply directly to federal employees and private companies" (Fire Chief, 1998, p. 44). This was corroborated in an interpretation letter by John Miles, OSHA's Directorate of Compliance, "Most firefighters are employed by local governments, however, and their operations are not governed by Federal OSHA" (OSHA, p. 2). Hal Bruno (1998) states, "OSHA has authority over the private sector, but cannot impose its rules on state or local governments." The summary portion of the Respiratory Protection; Final Rule (1998) says, "It should be noted that Federal OSHA's jurisdiction does not extend to employees of state and local governments; therefore public sector firefighters are covered only in the 25 states which operate their own OSHA-approved occupational safety and health programs" (p. 1155). The State of Florida is not one of the 25 OSHA plan states and as such is "not covered by these requirements, unless voluntarily adopted for local applicability." (Respiratory Protection, 1998, p. 1245). The Florida Fire Chiefs' Association position is:

OSHA does not have jurisdiction over state, county or municipal firefighters. Florida has not adopted the standard as policy. This means that Florida public fire departments are not required at this time to comply with either the OSHA or NFPA 1500 standard. (Florida Fire Chiefs' Association, 1998, p. 5)

According to the Florida Department of Labor and Employment Security as a public employer in the state of Florida, the Hialeah Fire Department employees are "covered by the Division of Safety standards adopted in Chapter 38I-20, Florida Administrative Code. To date, all public sector employees are covered under the July 1, 1993 edition of the Occupational Safety and Health Administration (OSHA) standards" (C. Vespi, personal communication, April 7, 1998, p. 1). Only, "subparts C through T and subpart Z of 29 CFR Part 1910 were adopted by 38I-20.003 of the Florida Administrative Code" (Florida Administrative Code, 38I-20.003). The Florida Division of Safety's legal opinion for interior structural fire fighting is: "The rule applies only to public employers, which include the state and its political subdivisions, and does apply to private employers." (Florida Department of Labor and Employment Security, Clarification of Standards for Fighting Interior Structural Fires letter, 1998, p. 1). Charlene Vespi, Program Manager, of the Occupational Safety and Health Unit of the Florida Department of Labor and Employment Security does acknowledge the OSHA Final Rule that goes into effect April 8, 1998 but states, "The division has not adopted this standard for public sector employers and will not do so until authorized by the Florida Legislature" (C. Vespi, personal communication, September 21, 1998,).

The literature review revealed that safety was the prominent subject on the two-in/two-out provisions in much of the material. Edwards (1998) states, "our goal should be to be in compliance, but more importantly to be safe" ( p. 42). OSHA (1998) states the new regulation

will improve safety and firefighters will be among the more than 900 workers annually whose lives can be saved. This new OSHA respiratory standard, 29 CFR 1910.134, “is being treated by OSHA and some in the fire service as an important step toward improving firefighter safety” (Manning, 1998, p. 4).

“By issuing the standard, the Federal Government has recognized that the level of fire risk that the community is willing to accept must not be confused with protection of the health and safety of fire personnel” (IAFF, January-February, 1998, p. 10). The U.S. Assistant Secretary of Labor Charles Jeffress said two-in/ two-out “is going to save firefighters’ lives and we couldn’t (sic) have done it without the strong support of President Whitehead and your 2,500 locals.” (IAFF, September-October, 1998, p. 8). Alfred K. Whitehead, president of the International Association of Fire Fighters (IAFF), which waged a long campaign for the rule to be adopted, addressed it as “the most significant advance in firefighters safety in this decade...it will save firefighters’ lives this year and for years to come” (Bruno, 1998, p. 10). Campell (1998) reiterates this by saying “this regulation is a lifesaver for the man and women whose job it is to save lives” (p. 12).

“The firefighting community already recognizes that one person alone cannot be sent safely into a structure to fight a fire that is beyond the incipient stage” (Respiratory Protection, 1998, p. 1245). This is supported by the NFPA, “Members operating in hazardous areas at emergency incidents shall operate in teams of two or more” (NFPA, 1997, 6-4.3). There are reports to substantiate these claims. In Pittsburgh, Pa., after the adoption of two in/ two out procedures firefighters’ lives have been saved,

In one case, four firefighters who were performing an interior attack on an apartment fire became disorientated and were trapped in the building. The stand by personnel were able to

initiate rescue operations promptly. As a result, although the four interior firefighters and two rescuers were injured, all survived. (OSHA, 1998, p. 2).

“OSHA has received reports of a number of incidents in which failure to follow two in and two out procedures has contributed to firefighter casualties.” according to an OSHA (1998) interpretation letter (p. 1). Allison Hudgins, widow of a fire fighter killed while engaged in interior structural fire fighting remarks, “My husbands death was not in vain. I hope and pray that, thanks to this new rule, no other fire fighters will lose their lives because no one was standing by to help them” (IAFF, January-February, 1998, p. 10). It is pointed out that, “experience has shown that lives could have been saved if an outside rescue team had been standing by, ready to assist firefighters when they got in trouble” (Bruno, 1998, p.10).

“The NFPA reports in some years 20% of fireground fatalities are related to firefighters becoming lost or disorientated in buildings. In some cases, once the incident commanders became aware of missing or trapped fire fighters, there were no resources immediately available to rescue them” (Cobb, 1998, p. 54). Edwards (1998) concludes the departmental approach to this issue will be the determining factor in ensuring a safer workplace in a very dangerous occupation.

The Board of Directors’ of Fire Department Safety Officers Association’s (FDSOA) mentioned the ethics issue in their unanimous opinion is to support the two-in/ two-out concept. “Your board reviewed criteria developed on the issue, but the real driving force was that it is the right thing to do. Regardless of what anyone says, we have a moral obligation to our members” (Soros, 1997, p.8).

Bruno (1998) concedes that, “communities can set the number of fire houses and total personnel but, it has no power or right to determine the number of personnel needed to keep fire fighters safe at an emergency incident”(p. 10).

The risk management issue is addressed in some of the literature. The United States Fire Administration states, “The risk that an individual or organization could be held legally responsible for an undesirable outcome is one important consideration in risk management” (FEMA, 1996, p. 47). The Florida Fire Chiefs’ Association’s (1998) position is in the event of an injury or death at a fire the standard might be part of a civil liability assertion that a department is not meeting a recognized standard. The two-in/two-out provisions mirror the NFPA 1500 standard 6-4. “Organizations are generally considered to be legally responsible for any harm that results from their acts or omissions, and are expected to conduct their activities in a responsible manner” per the United States Fire Administration (USFA) (FEMA, 1996, p. 47). “There is a question of liability they might force in the event of a firefighters death that could have been avoided if there had been outside rescue team” (Bruno, 1998, p.10). Soros (1997) says “in court the precedent can be established that lack of adequate manpower caused, or was serious physical harm, plus the fact that that there are feasible and useful methods that can correct this situation” (p. 8).

The Final Rule specifically addresses the two in and two out requirements for interior structural fire fighting.

(4) Procedures for interior structural fire fighting. In addition to the requirements set forth under paragraph (g) (3), in interior structural fires, the employer shall ensure that: (i) At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times; (ii) At least two employees are located outside the IDLH atmosphere; and

(iii) All employees engaged in interior structural fire fighting use SCBAs. Note 1 to paragraph (g): One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any fire fighter working the incident. Note 2 to paragraph (g): Nothing in this section is meant to preclude fire fighters from performing emergency rescue activities before an entire team has assembled. (Respiratory Protection, 1998, p.1274).

“There regulations are in effect at any fire which is beyond the initial stage and which portable fire extinguishers, Class II standpipe or small hose systems cannot control or contain without fire fighters donning their protective clothing or SCBA” (Respiratory Protection, 1998, p. 1274). “OSHA considers such fires to be immediately dangerous to life and health (IDLH)” (IAFF, January-February, 1998, p. 10). OSHA expects employers to be proactive in consideration of IDLH atmospheres. As is stated in the Summary and Explanation of the Final Rule:

Where employers are uncertain about the adequacy of a given respirator for a highly hazardous atmosphere, cannot identify the atmospheric concentration of a substance that poses a potentially life-threatening or health-impairing risk, or cannot maintain the concentration of such a substance below life-threatening or health-impairing levels, the employer must consider the atmosphere IDLH,” (Respiratory Protection, 1998, p. 1185).

“An interior structural fire in the incipient stage is always considered to be an IDLH atmosphere requiring the use of SCBA and other mandatory provisions” (Edwards, 1998, p. 42).

“The two in two out provision is consistent with NFPA 1500 which requires those working



inside the IDLH (immediately dangerous to life and health) environment must use a buddy system, and that there are to be at least two persons outside the IDLH atmosphere who can render immediate assistance to those inside, if needed” (Seymor, 1998, p. 4).

“The two fire fighters who enter the IDLH atmosphere must remain in visual constant with each other” (Campell, 1998, p. 12). An interpretation letter from OSHA states, “This assures that the two in can monitor each other and assist with equipment failure or entrapment or other hazards” (OSHA, 1998, p. 1).

“OSHA has made clear that these provisions require more than one standby person to be present. The two out requirement is to ensure the safety of the two in” (Respiratory Protection, 1998, p. 1245). “The ‘two out’ can monitor those in the building, initiate rescue, or call for back-up.” (OSHA Standard Interpretation and Compliance Letter, 1998, p. 1). Bruno (1998) takes the position that “The outside team must have direct contact with the interior teams by voice, visually or with a rope” ( p. 10).

The two-out are required by the Final Rule to be properly trained and equipped to rescue the two-in. The Final Rule “specifies that back-up personnel shall stand y (sic) with equipment ready to provide assistance or rescue” (Respiratory Protection, 1998, p. 1245). “The absence of properly equipped standby personnel greatly increases the risk to the employees who enter the IDLH atmosphere” (Kolomay and Hoff, 1998, p. 2). Cobb (1998) asks and answers in reference to rapid intervention teams, the two-out, “What tools does (sic) this important fireground team need? The same tools that are used to rescue civilians” (p. 52).

Cobb (1998) specifically mentions, “the basic tools are SCBA, prying tools, (axes, halligen tool, Kelly tool and short pike pole); striking tools (flathead ax, sledgehammer and maul) and cutting tools (K-12 or chain saw).” Cobb also recommends, “The teams also should

carry any specialized equipment your department has available; for example; a thermal imaging camera” (p. 52).

Bruno (1998) briefly addresses the use of multiple rapid intervention teams by saying, “At a multiple-alarm fire, there may be outside rescue teams assigned to both the front and rear of the building or at a side exposure where fire fighters have made entry” (p. 10).

The Final Rule allows for an additional role for one of the two-out. “One of the two individuals outside the IDLH atmosphere may be assigned to an additional role, such as IC or safety officer, so long as he or she is able to render assistance or perform rescue activities without jeopardizing any other fire fighter working at the incident” (Campell, 1998, p. 12). “The outside rescue team cannot be given other assignments through one member may be the incident commander or the safety officer” (Bruno, 1998, p. 10).

One of the two out standby team “must be free of all other tasks in order to account for and, if necessary, initiate a rescue for those fire fighters inside. While the other fire fighter may perform some tasks, he or she must be able to abandon them without jeopardizing the safety and health of others at the scene” (IAFF, January-February 1998, p. 10). “One of those persons can be engaged in other activities, such as command or safety assignments, so long as their participation in a rescue would not jeopardize the safety or health of any fire fighter working at the incident” (Florida Fire Chiefs’ Association, 1998, p. 5). “Many fire departments already are operating with variations of the ‘2-in/2-out’ procedures. Some designate a first alarm unit or special-call an additional company stands by as the ‘safety’ or ‘rapid intervention’ team at a working structure fire” (Bruno, 1998, p. 3).

The two-in/two-out provisions allow for rescues or attempted rescues with less than the two-out requirement. Edwards (1998) states for obvious rescue situations, “when four fire

fighters aren't yet assembled on the scene. While complying with the standard, fire fighters can perform rescues before the entire team is assembled, but only under certain conditions" (p. 44). Rescue is always the number one priority at the scene of a structure fire. The two-in/two-out rule is essentially waived in rescue situations when immediate intervention is necessary to save lives" (Marentette, 1998, p. 36). The Florida Fire Chiefs' Association (1998) opinion is "that nothing in the standard is meant to preclude fire fighters from performing emergency rescue activities before an entire team has assemble" (p. 5). This is an acceptable level of risk according to the United States Fire Administration, "Activities that present a significant risk to the safety of members shall be limited to situations which there is a potential to save endangered lives" (FEMA, 1996, p. 73).

Marentette (1998) states "the fire services generally accepted position is that no building is worth a fire fighter's life" (p. 36). As the USFA professes, "Activities routinely employed to protect property shall be recognized as inherent to the safety of members, and actions shall be taken to reduce or avoid those risks" (FEMA, 1996, p. 73). "The OSHA rule bars us from interior operations at a structure fire if rescue is not an issue and we don't have the bare minimum number of personnel needed to protect each other", according to Marenette (1998) (p. 36). However, "it's emphasized that this deviation from the regulation is an 'exception' and NOT the rule"(Bruno, 1998, p. 10). Bruno (1998) continues with, "the two-person buddy system is to be mentioned while carrying out search-and-rescue operations. Once the rescuers are completed, the two-in/two-out procedures must be implemented as extinguishment gets underway" (p. 10).

"A written explanation for these deviations sometimes called the Good Samaritan exception, from the two-in/two-out provisions needs to be documented according to an article in

the International Fire Fighter” (IAFF, January-February, 1998). The IAFF further professes, “Fire departments must thoroughly investigate the circumstances surrounding Good Samaritan exception, with a written report submitted to the Fire Chief” (IAFF, January-February, 1998, p. 10).

The minimum staffing of fire companies has been a topic of debate in the fire service for years. “The new OSHA standard does not deal with minimum staffing of fire companies and is only concerned with the deployment of personnel” (Bruno, 1998, p.10). Assistant Secretary Jeffress states, “Our new standard clarifies once and for all the need for two fire fighters outside when two firefighters are inside a burning building, fighting a structural fire” (IAFF, September-October 1998, p. 8). Bruno (1998) reiterates this by saying “firefighters must operate in two person teams at all times when making an interior attack, and two firefighters must remain outside” (p. 10).

Campell (1998) in an article in Fire Chief says that no less than four firefighters must be on scene during interior operations in order to comply with the two-in/two-out provisions. Marentette (1998) agrees by stating “that now we are required to place a minimum number of people on the fire ground we will take whatever actions are needed to deliver at least four firefighters to structure fires” (p. 36). In reference to an interior attack on a building fire, Manning (1998) states it “cannot begin unless at least two firefighters are on the line and at least two firefighters are outside” (p. 4).

The Hialeah Fire Department operates seven fire stations within the 22 square miles of the city limits. All personnel assigned to these fire stations are Florida State certified fire fighters. The Operations Division personnel who staff these stations are managed and administered by one battalion chief and two district chiefs for each of the three 24 hour shifts.

Although minimum manning is not a requirement, the normal personnel assignment is three for each of the seven engine, two ladder and six rescue companies. Each company is assigned an officer, driver/engineer, and at least one firefighter. The hazardous material unit's normal personnel assignment is two. (Deputy Chief Roger Letourneau, personal interview, January 9, 1999). Bruno (1998) makes the assessment that "two- and three-person fire companies have problems meeting standards and cannot operate as effectively or as safely as companies with four or five firefighters." (p. 10). Marentette (1998) states, "The optimum approach is to put at least four full-time personnel on a sufficient number of companies to initiate an interior attack within four minutes of the first alarm." (p. 36). The Hialeah Fire Department budget requests for additional firefighters in order to assign four to each company has repeatedly been denied for years.

Prior to June 1996 the Hialeah Fire Department dispatched a district chief, two engines, one rescue and a ladder company for reported house fires. This was also the dispatch for reported target hazard and commercial fires with the addition of the battalion chief. A second alarm dispatch responds with an additional two engines, two rescues, one ladder and one chief. (Deputy Chief Roger Letourneau, personal interview, January 9, 1999). "The same steps you would use to summon additional; manpower for an escalating fire should be put to use to call for a rapid intervention team" (Cobb, 1998, p. 56).

On June 25, 1996 an Interdepartmental Memorandum was issued requiring the dispatch of an additional rescue company for structural and commercial fires to increase the manning on the fire scene. (Hialeah Fire Department Administrative Memorandum # 96-53, June 25, 1996). "It is our intention to have a rescue crew ready to move and assist any of our firefighters if they

become victims” (Hialeah Fire Department Administrative Memorandum # 96-53, June 25, 1996).

The expected behavior for fire fighting operations is an immediate, aggressive interior attack on the fire with full protective equipment (PPE), SCBA utilized, and PASS alarm activated to ensure the safety of the firefighters. (Deputy Chief Roger Letourneau, personal interview, January 9, 1999). Edwards (1998) states, “of considerable controversy, and requiring a real behavioral change in our firefighters, is determining when they can enter an interior structural fire and when they can’t.” (p. 44). Edwards also believes “realistic training scenarios that reflect your department’s true capabilities and ensure that everyone understands their responsibilities” will be one of the hardest aspects of the standard to properly enforce. (p. 44).

## **PROCEDURES**

### **Definition of terms**

CFR. Code of Federal Regulations.

IDLH (immediately dangerous to life and health). An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual’s ability to escape from a dangerous atmosphere.

Incipient Stage Fire. A fire which is in the initial or beginning stage and which can be controlled or extinguished by portable fire extinguishers, Class II standpipe or small hose systems without the need for protective clothing or breathing apparatus.

Initial Stage of Incident. During the initial attack when only one team is operating in the IDLH atmosphere of a structure fire. Once a second team is assigned or operating in the IDLH atmosphere the incident is no longer considered in the initial stage.

Interior Structural Fire Fighting. The physical activity of fire suppression, rescue or both inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage.

NFPA. National Fire Protection Association.

OSHA. Federal Occupational Safety and Health Administration.

RIT (rapid intervention team). A rescue crew available to perform assistance or rescue activities to the interior structure fire fighting team.

SCBA (self-contained breathing apparatus). An atmosphere supplying respirator for which the breathing air source is designed to be carried by the user.

Standby Team. In the initial stages of an incident the two members outside the IDLH atmosphere performing either one of the following: (A) Designated and dedicated as a Rapid intervention team. (B) Performing other functions but ready to perform as a Rapid intervention team.

Two-in/Two-out. At least four fire fighters are required on the scene and two fire fighters are located outside the IDLH atmosphere during interior structural fire fighting in fires beyond the incipient phase.

### **Research Methodology**

The desired outcome of this research was to develop a standard operating procedure (see Appendix A) to comply with the two-in/two-out provisions of the 1998 Final Rule of OSHA's Respiratory Protections Act, 29 CFR part 1910.134. In addition, to develop, implement and distribute a checklist (see Appendix B) and equipment list (see Appendix C) for the RIT officer to utilize. Action research was supported by historical and descriptive research. The research was descriptive only in that an informal interview used. In that the requirements of the two-

in/two-out and the current procedures of the Hialeah Fire Department regarding interior structured fire fighting were identified.

The research was historical in that a literature review was conducted to obtain all information. The information reviewed was in the form of articles in professional publications, Federal regulations, USFA publications, Florida Statutes and Administrative Code, official correspondence letters, internal departmental statistical data, the Internet, Hialeah Fire Department policy, and an interview with Hialeah Fire Department Deputy Chief of Operations Roger Letourneau. Twelve fire departments in the South Florida area were requested to send information on their two-in/two-out or RIT procedures. All of the five fire departments who responded had not formally adopted two-in/two-out or RIT procedures or guidelines. These five did send their proposed procedures or guidelines.

The research was action in that the information was used to develop a standard operating procedure ensuring compliance with the two-in/two-out requirement of the Respiratory Protection; Final Rule for the Hialeah Fire Department and others who wish to comply. A RIT checklist and equipment list were developed as a result of this action research, also. The two-in/two-out SOP developed by this research is shown in Appendix A. Appendix B is the RIT checklist and Appendix C is the equipment list.

### **Literature Review**

The literature review began at the National Fire Academy's Learning Resource Center in August 1998. Subsequent references from the Learning Resource Center were obtained through the Interlibrary Loan Program (ILL) and delivered to the JFK library in Hialeah, Florida for photocopying. Additional literature references were reviewed on the Internet, at the Hialeah Fire Department Training Academy Library in Hialeah, Florida, correspondence with Florida



Division of Safety and Employment Security officials, area fire department correspondences, and this researcher's private library. An informal interview with Deputy Chief of Operations Roger Letourneau was conducted at the Hialeah Fire Department Fire Administration building on January 9, 1999. This researcher's personal knowledge of the Hialeah Fire Department also contributed to this research project.

### **Limitations**

The limitations that affected this research project included time, lack of statistical data on the effectiveness of the two-in/two-out provisions, and the two-in/two-out provisions being new.

The six-month time limit required by the National Fire Academy for the completion of Executive Fire Officer applied research projects, did not allow a more thorough review of available literature or a survey to be performed.

This is a new provision to a revised standard, which limits the availability of any statistical data or research between the two-in/two-out provisions, and their desired effect limited this research project. The lack of two-in/two-out standard operating procedures or guidelines for South Florida area fire departments was also a limiting factor since this is not a requirement under Florida regulations.

### **Assumptions**

The procedures used to complete this research project were based on three assumptions. First, it was assumed all authors included in the literature review performed objective and unbiased research in the preparation of their work. Second, it was assumed that Deputy Chief of Operations Roger Letourneau had sufficient historical and present knowledge of the Hialeah Fire Department to answer the interview questions. It was also assumed Chief Letourneau answered

the questions honestly and to the best of his ability. Finally, the fire departments that responded to the information request were honest in their responses.

## **RESULTS**

Question 1. Is the Hialeah Fire Department required to comply with the two-in/ two-out provisions of the OSHA's 1998 Respiratory Protection; Final Rule?

The Hialeah Fire Department is not legally required to comply with the two-in/two-out provisions since the State of Florida is not an OSHA plan state. Presently Florida public fire departments are required under Florida Administrative Rule to comply with the 1993 OSHA Respiratory Protection standards which do not include the two-in/two-out provisions for interior structural fire fighting. However, compliance with the two-in/two-out provisions would increase fire fighter safety during interior structural fire fighting and ethically it is the right thing to do. Compliance with the two-in/two-out provisions is a prudent risk management practice and should reduce the civil liability to the department if a death or injury were to occur during interior structural fire fighting.

Question 2. What are the requirements of the two-in/two-out provisions of OSHA's 1998 Respiratory Protection; Final Rule?

For fires beyond the incipient stage the two-in/ two-out provisions require two personnel to enter an IDLH or unknown atmosphere and be in voice or visual contact at all times. Two additional personnel shall be on standby ready to affect a rescue if the interior personnel need it. One of the standby personnel may have additional duties; as long as abandoning those duties do not jeopardize the safety of the interior personnel. Standby personnel must be properly trained and equipped to affect a rescue if need be. An exception to the two-in/ two-out rule is

permissible if an immediate rescue is warranted to prevent serious injury or loss of life. This must be the exception and not the rule.

Question 3. What is the minimum number of fire fighters required on the fire ground prior to initiating an interior structural fire fighting operation in accordance with OSHA's 1998 Respiratory Protection; Final Rule?

The minimum number of fire fighters required prior to initiating an interior structural fire fighting operation is four. A minimum of two fire fighters in voice or visual contact are required to enter the IDLH atmosphere for interior structural fire fighting. (29CFR1910.134). Two additional fire fighters, properly trained and equipped, must be outside the IDLH atmosphere ready to rescue those in the IDLH atmosphere should an emergency arise. This is commonly referred to as "two-in/two-out". An exception to the two-in/two-out is permissible to save a life or prevent serious injury. This exception must be properly documented and must not be the rule.

Question 4. What changes are required by the Hialeah Fire Department to comply with the two-in/two-out provisions?

The adoption of the standard operating procedure in Appendix A will enable the Hialeah Fire Department to comply with the two-in/two-out provisions of the Final Rule. The normal assignment of three personnel to each fire fighting company allows the company officer and the firefighter to be the entry team (two-in). The driver/engineer of this company and the next arriving properly trained and equipped fire fighter will be the standby personnel (two-out). All the firefighter personnel must be educated and trained on the requirements of the two-in/two-out provisions. This will require a mind set change for all personnel. The fire fighting personnel must wait until four properly trained and equipped fire fighting personnel are on the fire ground. An aggressive interior attack with less than four personnel on the fire ground is only permitted

for the exception. The exception to the four personnel minimum is permissible to save a life in an immediate life-threatening situation.

Once additional fire fighting personnel arrive on the fire scene a RIT will be established. The RIT will use the RIT checklist and RIT equipment list in Appendix B and C, respectfully.

The final products of this research project are a RIT standard operating procedure, a RIT checklist and RIT equipment list for the Hialeah Fire Department. This standard operating procedure, checklist, and equipment list are in Appendix A, Appendix B, and Appendix C, respectfully. The standard operating procedure and subsequent lists provide the personnel of the Hialeah Fire Department the necessary information and guidance to increase safety during interior structural fire fighting operations and manage risk prudently.

## **DISCUSSION**

The RIT standard operating procedure, checklist, and equipment list which represent the results of this research, reflect the functionality of safe operations and sound risk management as they relate to interior structural firefighting for fires beyond the incipient stage.

Legal Compliance with the two-in/two-out provisions of OSHA's 1998 Respiratory Protection; Final Rule are mandatory for the 25 plan states and the private sector. (Respiratory Protection, 1998). Charlene Vespi of the Florida Department of Labor and Employee Safety, is very clear that public employers in Florida must comply with the 1993 OSHA standards, as adopted by Florida Administrative Code.( C. Vespi, personal communication, September 21, 1998). The IAFF ( January- February, 1998) has vigorously pursued the addition of these new two-in/two-out provisions as the most significant advancement for fire fighting safety in this decade and for years to come. Many leaders in the fire service community agree that the two-in/two-out will improve fire ground safety. Campbell (1998) calls it, a lifesaver, Edwards (1998)

says it will ensure a safer workplace, and Bruno's (1998) position is two-in/two-out will keep fire fighters safe.

The IAFF and OSHA have evidence where non-compliance and compliance with two-in/two-out has affected fire ground safety and some fire departments have been held liable for not complying with these standards. The National Institute of Occupational Safety and Health (NIOSH) found a Kentucky fire department deficient in following the two-in/two-out provisions in the death of a firefighter. The firefighter was trapped for eight minutes before others on the scene were aware he was missing. (IAFF, June-July, 1997). The International Fire Fighter (January-February, 1998) quotes a fire fighter's widow, who hopes that no other fire fighters will lose their lives because no one was there to save them. OSHA (Interpretation Letter, 1998) reports of an incident where four firefighters who were disorientated and trapped in a building were saved since the standby personnel were able to initiate rescue operations. The firefighters were injured but all survived.

Ethically we have a moral obligation to our members to do the right thing. (Soros, 1998). By increasing safety during interior fire fighting operations we meet one of our moral obligations to our personnel.

Compliance with the new two-in/two-out provisions, although not legally mandated in Florida, "is one important consideration is risk management" (FEMA, 1996, p. 47). Compliance with OSHA's two-in/two-out provisions demonstrates the organization is meeting a recognized standard to provide a safer work place for its personnel. (FEMA, 1996).

By adopting the new two-in/two-out provisions, OSHA specifically recognized that interior structural fire fighting has inherent dangers different than other occupations. Structural fires beyond the incipient stage where an unknown or IDLH atmosphere exist required two

personnel to enter and two standby personnel to be present prior to entry. (Respiratory Protection, 1998). The two-in/two-out provisions allow for immediate rescues prior to the two standby personnel being on the scene. (Respiratory Protection, 1998). One of the standby personnel may have additional duties but must be ready to rescue or assist the two-in. (Respiratory Protection, 1998). In order to meet the two-in/two-out provisions a minimum of four fire fighters are required on scene prior to initiating an interior attack. (Campbell, 1998).

The normal personnel assignment of three fire fighters to each company does not allow the Hialeah Fire Department to initiate interior structural firefighting for fire beyond the incipient stage unless additional fire fighting personnel arrive. A fire fighting company arriving alone on a fire scene must wait for additional personnel to arrive. This requires a mind set change for our fire fighting personnel. Edwards (1998) concurs that this requires “a real behavioral change in our firefighters, is determining when they can enter an interior structural fire and when they can’t. Since in many cases we’re trying to change behavior and tradition, this will be a substantial challenge for training officers.” (p. 44). The Hialeah Fire Department expects the first company to conduct a rapid search and aggressive interior attack on the fire immediately upon arrival. (Roger Letourneau, personal interview, January 9, 1999).

The Hialeah Fire Department can comply with the two-in/two-out provisions by continuing to utilize the first arriving company officer and fire fighter assigned to each company as the entry team (two-in) to initiate an aggressive interior attack for structural fires beyond the incipient stage. (Deputy Chief Roger Letourneau, personal interview, January 9, 1999). They must wait to enter the IDLH atmosphere until the standby personnel (two-out) are assembled on the fire scene. (Respiratory Protection, 1998). The driver/engineer of the first arriving company and the next fire fighter to arrive on the fire scene will be the standby personnel (two-out). The

first arriving company officer can enter the IDLH atmosphere with less than four personnel on the fire scene if in their judgement immediate entry will prevent the loss of a life. (Respiratory Protection, 1998).

“The rapid intervention team should be part of the incident commander’s overall strategy and tactics” (Cobb, 1998, p. 56). Once additional fire fighting personnel arrive on the fire scene the incident commander establishes a RIT from companies on the scene or requests a second alarm assignment. Cobb agrees with his procedure by saying, “The same steps you would use to summon additional manpower for an escalating fire should be put to use to call for a rapid intervention team.” (p. 56). Cobb (1998) states, “The basic concept of the rapid intervention team is simple – they are the first responders sent to rescue or locate trapped or missing firefighters.” (p. 52). The RIT officer reports directly to the incident commander. Edwards (1998) states, “The teams need to know what duties they can or cannot perform on the emergency scene” (p. 44). The RIT officer’s responsibilities include monitoring the interior team or teams, utilizing the RIT checklist for a size-up and assembling and deploying the RIT equipment. Cobb includes his list of RIT tasks; a size-up noting locations of entrances and means of egress, one member will monitor fireground radio transmissions, assess the location for portable ladders with the RIT placing at least one ground ladder on the front of the building or endangered exposure, to the fire floor or the floor above. (Cobb, 1998). The incident commander may establish additional rapid intervention teams if the tactical assignments exceed the ability of the RIT to respond in a timely manner or tactical assignments of a very dangerous nature.

## RECOMMENDATIONS

The Hialeah Fire Department's standard operating procedures should comply with the two-in/two-out provisions of OSHA's Respiratory Protection; Final Rule of 1998. The standard operating procedures should reflect the provisions of the two-in/ two-out in an orderly fashion. All fire fighters and officers should be held responsible for adherence to these procedures to improve fire ground safety. These procedures should define IDLH, incipient stage, two-in, two-out, properly trained and equipped, additional duties, exception to the Final Rule, and when to institute standby personnel as opposed to a RIT. This will provide compliance with the two-in/two-out provisions, improve fire ground safety, and reduce the liability for the Hialeah Fire Department.

The RIT standard operating procedure, checklist, and equipment list developed by this research should be adopted and implemented by the Hialeah Fire Department. Classroom and practical field training on the standard operating procedure, the rapid intervention team checklist, and the equipment list should be required of all department fire fighting personnel prior to implementation. The Training Division should utilize the "Working Fire" film series on rapid intervention teams as a foundation for the training. Practical field exercises can then be developed. Suitable bags or boxes for the rapid intervention team equipment should be procured and assigned to the battalion and district chief vehicles. When the department purchases thermal imaging devices they should be added to the RIT equipment list.

The literature review supports the idea of the standard operating procedure and rapid intervention team checklist for adoption and implementation by the Hialeah Fire Department. We should recognize the inherent risks to interior structural fire fighting and have assistance available for the two-in when the exception to the two-in/two-out provisions do not apply. The



fire department's personnel are our most valuable resource and we should take prudent steps to protect them. Therefore, every effort should be made to assemble four firefighters on the scene prior to initiating an interior fire fighting operation.

This researcher recommends further research on this subject for both paid and volunteer fire departments throughout the country.

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## **APPENDIX A**

### **Hialeah Fire Department**

### **Standard Operating Procedure**

### **Rapid Intervention Team**

1. It is the responsibility of all officers and fire fighters engaged in firefighting operations to adhere to these procedures. The Incident Commander is accountable for all procedures during fire fighting operations.
2. These procedures are applicable for interior structural fire fighting operations where the fire is beyond the incipient stage and fire fighters are exposed to atmospheres classified as suspected Immediate Dangerous to Life and Health (IDLH), confirmed IDLH or may rapidly become IDLH.
3. IDLH is defined as an atmosphere that poses an immediate threat to life, or would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.
4. Incipient stage is defined as a fire which is in the initial or beginning stage and which can be controlled or extinguished by portable fire extinguishers, Class II standpipe or small hose systems without the need for protective clothing or breathing apparatus.
5. Prior to entry into any of the atmospheres listed in 2 above, a minimum of four fire fighters shall assemble on the scene. Two fire fighters shall be designated the interior team and two fire fighters shall be designated the standby team. The standby team shall be ready prior to entry by the interior team.

6. The interior team shall remain in visual or non-radio voice contact at all times. They shall each have full personal protective equipment (PPE), SCBA, hand light and PASS device activated. They shall have among them a portable radio and a forcible entry tool.
7. The standby team shall have the same equipment as the interior team and in addition any other available tools and equipment deemed necessary to effect a rescue of the interior team. The standby team shall monitor the interior team and be prepared to rescue the interior team if needed. One of the standby team may have additional duties so long as abandoning these duties does not jeopardize the safety of the interior team.
8. The only exception to a minimum of four fire fighters assembled prior to entry shall be when in the officer's professional judgement it is determined that an immediate life-threatening situation exists where immediate action may prevent the loss of a life. Any time this exception is used, both the officer initiating the interior fire attack and the Incident Commander shall investigate and submit a written report of their actions and their reasons to the Fire Chief via chain of command and a copy sent to the Department Safety Officer and the Safety Committee.
9. Once additional fire fighting personnel arrive on the scene the Incident Commander shall assign and designate a Rapid intervention team (RIT) or teams and RIT officer. The RIT shall have full PPE, with SCBA and PASS device in a ready state, portable radio, hand lights, forcible entry tools and other equipment as deemed necessary to effect a rescue of the interior team or teams. The RIT officer shall be assigned to the Incident Command Post or a Sector Officer in order to monitor the deployment of the interior team or teams.
10. The RIT officer shall be responsible for monitoring the interior team or teams, assembling the RIT equipment and deploying the RIT equipment.

11. If the tactical assignment of interior teams exceeds the ability of the RIT to respond in a timely manner or is of a very dangerous nature additional Rapid Intervention Teams may be assigned and deployed at the discretion of the Incident Commander.

**APPENDIX B**

Hialeah Fire Department

Standard Operating Procedure

Rapid Intervention Team Checklist

<b>RAPID INTERVENTION TEAM CHECKLIST</b>		
RIT OFFICER		COMPANY
<b>CHECK PASSPORT ACCOUNTABILITY STATUS BOARD FOR LOCATION OF INTERIOR COMPANIES</b>		
<b>LAYOUT EQUIPMENT FROM RIT BAGS ON SALVAGE COVER</b>		
<b>SIZE-UP:</b>		
<b>BUILDING CONSTRUCTION:</b>	<b>TOOLS</b>	<b>FIRE CONDITIONS:</b>
Entry Points	Handlights	Location
Walls	Prying Tolls	Size
Roof	Striking Tools	Ventilation
Floors	K-12	Extension Probability
Floor Plan/Layout	Chain Saw	Extension Possibility
Area	Ladders	Life Hazards
Height	Aerial Apparatus	Wind Speed and Direction
Access		Time
Occupancy		

**APPENDIX C**

## Hialeah Fire Department

## Standard Operating Procedure

## Rapid Intervention Team Equipment List

1. Four flashlights.
2. Four door straps.
3. Four lifelines with bags.
4. One large bolt cutter.
5. One channel lock pliers.
6. One large Phillips screwdriver
7. One straight blade screwdriver.
8. One folding knife.
9. One snub nose pliers with side cutter.
10. Four sprinkler wedges.
11. One Halligan tool.
12. One 5' pry bar.
13. Two sledgehammers.
14. One Short pike pole.
15. One Flathead axe.
16. Four 10' nylon webbing.
17. One K-12 saw with wood, metal and concrete blades.
18. One chainsaw.
19. Emergency air supply or extra SCBA.